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% Bisection Method on function  $F(x)=x^4-25$ 
clc;
clear all;

% Inputs: a, b, tol, N0
tol = 1e-5; % error tolerance
N0 = 20; % maximum number of iterations
a=2; % starting left point
b=3; % starting right point

% Start Iterating

n = 1;
Fa = a^4-25;
Fb = b^4-25;

while n < N0

    p = a + (b-a)/2; % better way for writing  $p = (a+b)/2$ 
    Fp = p^4-25; % evaluate the function at p

    if Fp==0 || (b-a)/2 < tol
        % close enough to actual root, stop iteration
        break;
    elseif sign(Fa)*sign(Fp) > 0
        % continue search in right half interval
        a = p;
        Fa = Fp;
    else
        % continue search in left half interval
        b = p;
        Fb = Fp;
    end
    n = n + 1;

end

fprintf('Iteration number = %d \n', n);
fprintf('p = %.6f \n',p);
fprintf('F(p) = %.4f \n', p^4-25);
fprintf('Error= %.2e',abs(p-sqrt(5)));
```